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December 19, 2001

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IDAHO DEPARTMENT OF  
ENVIRONMENTAL QUALITY

**Certified Mail: 7000 1670 0010 7624 3826**

Tiffany Floyd, Regional Air Quality Manager  
Idaho Air Quality Bureau  
224 South Arthur  
Pocatello, Idaho 83204

RE: Fluoride in Vegetation

Dear Tiffany:

The attached document contains the results and summary of fluoride levels in forage vegetation as required in our Air Permit under Monitoring, Reporting, and Special Studies, Section 3.1.2 and 4.1.

We are presently planning the establishment of a grazing management team to include environmental personnel, the sampling contractor, and possibly area farmers. The end in mind is to promote effective feed forage management in cattle.

It has been the practice in past years for the contractor to notify area farmers of analysis results. This will continue.

Please call me if you have questions or comments.

Sincerely,

Leon C. Pruett  
Environmental Manager

Attachment:

C: Rick Elkins, DEQ Pocatello  
Melissa Keller, DEQ Pocatello  
Norm Self, Simplot

USEPA SF



1450562

**LEVELS OF FLUORIDE IN VEGETATION SAMPLES COLLECTED  
FROM POCA TELLO AREAS  
DURING THE 2001 GROWING SEASON**

**BAICOR INC.  
NOVEMBER 2001**

**DR. G.W. MILLER, PROFESSOR EMERITUS  
CONSULTANT**

**ASSOCIATE INVESTIGATORS  
MR. MICHAEL MILLER, B.S.  
MRS. RUTH MILLER, B.A.  
DR. SALAM AWADA  
DR. OLGA VEDINA**

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**IDAHO DEPARTMENT OF  
ENVIRONMENTAL QUALITY**

## 2001 Report

### Summary

During the 2001 growing season (June - September) alfalfa and pasture grass were sampled in Pocatello and analyzed for fluoride. Sites were divided into sampling areas as follows: Site 1 (North, South and South Duplicate); Site 2 (North and South); Site 3 (North and South); Site 4; Site 5 (East, West and West Duplicate); Site 6 (East and West); Sites 7,8,11 and 12. A control area was sampled in Logan, Utah. This sample was divided into two portions. One portion was labeled control and left for analysis in the Logan laboratory. The second portion was taken to Pocatello and stored with other samples taken during a survey trip and labeled Logan Trip. As a further check Site 1, South was spiked with 50.1 - 83 ppm fluoride and control with about 17.0 ppm fluoride. The accuracy of recovery in 16 spiked samples was from 80 - 106% (most spiked samples in the 90% recovery range).

The mean fluoride values in areas showing higher fluoride concentrations were within a 2 mile radius of the phosphate plants. Areas 1 and 2 were East of the plants. Mean values here were 34 - 46 ppm. Sites 3, 4 and 11 showed mean levels of 15 - 18 ppm. The 5 remaining sites were up to 5 miles from the source and had levels from 8 - 14 ppm. The highest levels found at Sites 1 and 2 during June and July were 67 and 65 respectively. Control levels in Logan had a mean value of 9 ppm. The Trip sample had a mean value of 8 ppm. Samples from Sites 1 and 5 were identical to duplicate samples taken at the same sites.

### General Information

Weather information for the growing season in Pocatello is outlined in Table 1. The sample dates were timed to be approximately 2 weeks apart during the growing season. Vegetation samples were taken on 6 June, 20 June; 9 July; 25 July; 8 August; 22 August; 13 September and 27 September. Table 2 shows information from our log book on the location of sites in Pocatello, owner of field, dates, crop grown, condition of the crop and fluoride levels. Table 3 shows individual values for all sites as well as mean values.

## WORK PLAN

### Fluoride Survey in 2001

#### Sampling Specifications

##### Sample Location

The Pocatello area would be sampled every two weeks within the industrial areas identified on the maps (Fig. 1 and 2). By May 15th of each year a list will be submitted to Simplot giving the following information:

1. Fifteen possible field locations for each area (designated on appropriate maps and selected from the 16 marked sites).
2. Names of field owners or lease holders.
3. Contact people with telephone numbers for each field location.

##### Quantity and Frequency of Sampling

Fields will be sampled during the growing season as determined by field survey (when 50% of fields have an average forage height over two inches; survey will be initiated and ended when 50% of fields have an average height of forage growth less than two inches). The length of growing season will be determined for each area.

The growing period is expected to cover a four month period, June through September. Specifications for this section are illustrated in the following table:

Area	# Samples/ Area	Months Sampling	Sampling Frequency	Total Samples/ Area/Year
Pocatello	Target is 15	4	2/Month	120

### 3. Sample Collection Procedures

Specific routes will be followed to collect samples. Routes will begin by collecting samples first from the areas most remote from the sources of fluoride and followed by samples taken from areas increasing in proximity to avoid sample contamination.

Actual samples will be taken using the following procedure:

- (a) After arriving at the desired field location, fields will be visually surveyed to determine if the average height of the forage is greater than two inches. If not the field will not be sampled.
- (b) If the average height of the forage is greater than 2 inches, the contact person (if available) will be notified before forage samples are taken.
- (c) Notes will be kept in a logbook concerning the condition of the field.
- (d) Samples will be taken using a "Z" pattern. Each sample shall consist of no less than 10 clippings taken no less than 10 feet apart. Clippings comprising each sample should be of sufficient quantity to half fill a 3 gallon bucket.
- (e) The forage sample in the container will be cut up until the maximum length is one inch and thoroughly mixed.
- (f) The date and field on a lunch-sized paper bag will be noted. The bag will be half-filled with the clipped forage sample and folded shut.
- (g) Left-over sample not to be analyzed will be discarded on the property from which it was taken.

NOTE: No samples will be taken from any forage less than two inches high.

Samples will be taken from standing forage.

Duplicates shall be taken from one-half of the samples in each area and held for nine months.

All results of sampling and analysis will be released to J.R. Simplot Company.

### Sampling Records

A log containing the following information will be made of the field work:

- (a) Date of Sampling;
- (b) Field identification number;
- (c) Field condition during sampling:
  - Whether recently cut (no sample taken)
  - Which cutting (1st, 2nd, 3rd, if known)
  - Whether healthy, heavy or sparse;
  - Injury symptoms (pathogens, toxicity, nutritional)
- (d) Is the field being grazed; and
- (e) Is an alternative field being sampled (reason).

## Analytical Requirements

For analyses of plant materials, samples were oven-dried in paper sacks at 80 C for at least 48 hours. finely ground in a Wiley mill and stored in a dry place until used.

A potentiometric method outlined by the Association of Official Analytical Chemists (Official Methods of Analysis of the Association of Official Analytical Chemists (AOAC), Edit. K. Helrick, 15th Edition. pages 51-56, 1990) will be followed in preparing the various forage samples for fluoride determinations and in making fluoride standard curves.

For analysis, one-fourth gram of a previously-ground sample was placed in an acid-cleaned plastic beaker to which was added 1 milliliter (ml) of analytical grade acetone for wetting of the dry material. Most of the acetone was allowed to evaporate from the material in a fume hood. Twenty ml of 0.05 N nitric acid solution was added. This mixture was stirred for at least 30 minutes with a magnetic stirrer, following which 20 ml of 0.1 N potassium hydroxide solution were added and stirred an additional 30 minutes. Next, 5 ml of 0.2 N nitric acid solution were added along with 5 ml of 0.4 M sodium citrate solution (pH 5.5), containing 1 part per million (ppm) fluoride. Samples were analyzed in duplicate using (two different digests) 2 fluoride electrodes. If the analyses differed they were repeated. Standards were run at least daily using 0.1 to 10 ppm samples. Periodically, to maintain quality control vegetation samples containing known fluoride concentrations were analyzed. Amounts of fluoride in each sample were calculated as ppm dry weight of plant material using the equation:

$$\text{ppm F (ug/g)} = \frac{(C - 0.1) 50}{W}$$

where:

C = ppm F from standard curve.

W = grams of sample used.

0.1 = ppm of F present in the sodium citrate solution.

50 = total ml of solution.

## **Supplementary Information to Include in the Fluoride Survey Plan for J.R. Simplot for 2001.**

### **I. Alternative Field Selection.**

The sampling sites will be divided into 5 categories depending on their distance from the emission source as follows:

- a. 0-1 miles
- b. 1-2 miles
- c. 2-3 miles
- d. 4-5 miles

In the event sites must be changed because of crops being grown other than forage crops, etc, an alternative site will be selected from the same site category (distance from the emission source).

### **II. Description of Potentiometric Instrument and Standard Curve Determination.**

1. The potentiometric instrument is an Orion 720 A that measures directly into relative millivolts. Any units may be used for calibration. The direct measurement technique involves calibrating the 720 A with one to five standards of known concentration. Unknown sample concentrations are then read directly from the display in the concentration units used for calibration. During calibration the most dilute standard should always be used first. The 720 A automatically recognizes slope direction. When 3 or more standards are used the instrument uses a point to point calibration scheme. When measuring in a particular region of the curve the electrode slope for that region is employed in the calibration of sample concentration. The electrode slope displayed after calibration is the average slope for all the segments of the entire calibration curve. Use of the scheme increases accuracy in the different regions of the calibration curve. Blank correction occurs automatically when three or more standard are used. The standards used for calibration do not need to include a blank.

Six standard solutions of fluoride will be used to determine the standard curve as follows: 10 ppm, 5 ppm, 2 ppm, 1 ppm, 0.5 ppm, and 0.2 ppm. Small plastic acid-washed containers will be used for the standard solutions. The standard solution will be placed into a plastic container containing a stirring bar. The electrode will be inserted into this solution about 12 mm and stirred magnetically. Relative mv readings will be noted at 3 minutes intervals until change is  $<0.2$  mv/min. The electrodes are then removed blotted lightly with absorbent paper, and repeated with 0.5, 1.0, 2.0, 5.0, and 10.0 ppm solutions. Two electrodes on two separate potentiometers are used for fluoride determination. A separate standard curve will be used for each electrode. Measurement in millivolts will be plotted against concentrations of standard solutions using semi-logarithmic 2 cycle paper, samples will be remade and reanalyzed.

The relationship between the  $\Delta$  mv and the fluoride level is linear with a semi-logarithmic graph when the fluoride concentration range is between 80 - 200 ppm. The co-efficient of variation of  $\Delta$  mv on each standard point (0.2, 0.5, 2.0, 5.0 and 10.0 ppm F) was in test results 2-3%.

### **III. Plan to Determine the Quality of Analysis and Control.**

(1) A sample blank will be prepared using procedures outlined previously for preparation of the plant material. Plant material will be used from an area remote from the fluoride emitting source containing low fluoride in the tissue. A known amount of fluoride will be added to the sample solution and percent of recovery determined.

(2) Spike materials will be used in order to assess percent recovery on one or more of the samples. The spike material will consist of the prepared plant sample to which a known amount of analyte (standard NaF) will be added. This should not be excessive in relation to the amount present (e.g., about 2x).

The analyte added should be in the same chemical form as present in the samples for accurate determination. The recovery rate of standard fluoride added to the sample with the fluoride electrode has been found to be 96.0-105.0% when measuring 20-100 ppm in the sample. Results of a spiked sample will be included with each analysis survey during 2001.

Table 1. WEATHER CONDITIONS IN POCA TELLO DURING THE 2001 GROWING SEASON.

<u>DATE</u>	<u>CONDITIONS OF TIME OF SAMPLING</u>
-------------	---------------------------------------

6/6/01	Clear, 10:00 am, wind from South East.
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6/20/01	Clear, slight breeze from West.
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7/9/01	Overcast, no wind at 11:00 am
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7/25/01	Clear, wind from West
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8/8/01	Clear, no wind yet at 9:00 am.
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8/22/01	Clear, no wind yet at 12:00 am.
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9/13/01	Clear, rained last night, wind from the North at 11:18 am.
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9/27/01	Clear, slight breeze at 10: 44
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## Fluoride Analysis

Fluoride values for the plant samples collected at the various sites throughout the growing season are shown in Table 3 and illustrated in Figures 1-5. Eleven sites located up to 5 miles from the manufacturing source had mean fluoride values ranging from 8 - 15 ppm. Individual fluoride values at these sites at different times in the growing season ranged from 3 to 35 ppm. A Mean value of 18 ppm fluoride was found at 1 site. This site (4) had values from 13 - 36 ppm at sometime during the growing season. Four sites within a two mile radius of the fluoride source had mean fluoride values from 34 to 46 ppm. Individual high fluoride values at these 4 sites (1 North, 1 South, 2 North, 2 South) were 32 - 67 ppm in June and July. Control mean value of the Logan, Utah Site was 9 ppm fluoride and ranged from 6 - 13 ppm throughout the growing season.

Figure 6 illustrates the location of sites in the Pocatello area showing mean fluoride values for the season. Average fluoride values for each site is shown in relation to location and distance from phosphate plants.

Figure 7 illustrates a fluoride concentration map of Pocatello in the sampling area. Symbols denote the plant species sampled. The fluoride concentrations are shown in shaded areas at 0 - 15 ppm, 16 - 30 ppm, 31 - 50 ppm. Table 4 shows the average fluoride content in plant samples over a 5 year period 1997-2001. Average values for 2000 and 2001 are similar.

**Table 2. Log information on Pocatello Sites. 2001**

**A. (#1 North)**

**Owner: Rulon Gull**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Alfalfa	Great- Ready to cut	65
6/20/01	Alfalfa	Great- Recently cut	55
7/9/01	Alfalfa	Great	40
7/25/01	Alfalfa	Great - Tall	32
8/8/01	Alfalfa	Good- Just cut	30
8/22/01	Alfalfa	Good - Irrigated	20
9/13/01	Alfalfa	Good	36
9/27/01	Alfalfa	Good- Recently cut	42

**B. (#1 South)**

**Owner: Rulon Gull**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Alfalfa	Great- Ready to cut	65
6/20/01	Alfalfa	Great- Recently cut	67
7/9/01	Alfalfa	Great	49
7/25/01	Alfalfa	Great - Tall	35
8/8/01	Alfalfa	Good- Just cut	48
8/22/01	Alfalfa	Good - Irrigated	25
9/13/01	Alfalfa	Good	43
9/27/01	Alfalfa	Good- Recently cut	39

**C. (#1 South Duplicate)**

**Owner: Rulon Gull**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Alfalfa	Great- Ready to cut	67
6/20/01	Alfalfa	Great- Recently cut	67
7/9/01	Alfalfa	Great	40
7/25/01	Alfalfa	Great - Tall	37
8/8/01	Alfalfa	Good- Just cut	47
8/22/01	Alfalfa	Good - Irrigated	27
9/13/01	Alfalfa	Good	37
9/27/01	Alfalfa	Good- Recently cut	33

**D. (#1 South Spiked)****Owner: Rulon Gull**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Alfalfa	Great- ready to cut	142
6/20/01	Alfalfa	Great- recently cut	140
7/9/01	Alfalfa	Great	115
7/25/01	Alfalfa	Great - tall	90
8/8/01	Alfalfa	Good- just cut	104
8/22/01	Alfalfa	Good - irrigated	89
9/13/01	Alfalfa	Good	96
9/27/01	Alfalfa	Good-recently cut	90

**E. (Control-Sample Remained in Logan)****Owner: Kent Frandsen**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Grass	Great- Grazed	9
6/20/01	Grass	Great- Grazed	11
7/9/01	Grass	Great - Grazed	13
7/25/01	Grass	Great - Grazed	7
8/8/01	Grass	Great- Grazed	7
8/22/01	Grass	Good - Grazed	7
9/13/01	Grass	Good- Grazed	6
9/27/01	Grass	Good-Grazed	12

**F. (Control-Spiked)****Owner: Kent Frandsen**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Grass	Great- Grazed	23
6/20/01	Grass	Great- Grazed	27
7/9/01	Grass	Great - Grazed	28
7/25/01	Grass	Great - Grazed	23
8/8/01	Grass	Great- Grazed	19
8/22/01	Grass	Good - Grazed	19
9/13/01	Grass	Good- Grazed	20
9/27/01	Grass	Good-Grazed	23

**G. (Control-Sample Taken on Fluoride Trip)****Owner: Kent Frandsen**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Grass	Great- Grazed	8
6/20/01	Grass	Great- Grazed	8
7/9/01	Grass	Great - Grazed	11
7/25/01	Grass	Great - Grazed	9
8/8/01	Grass	Great- Grazed	7
8/22/01	Grass	Good - Grazed	5
9/13/01	Grass	Good- Grazed	6
9/27/01	Grass	Good-Grazed	10

**H. (#2 North)****Owner: Payne Wiegel**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Grass	Great	38
6/20/01	Grass	Good	31
7/9/01	Grass	Good - Grazed	15
7/25/01	Grass	Good - Grazed	52
8/8/01	Grass	Great - Tall	48
8/22/01	Grass	Good - Grazed	25
9/13/01	Grass	Good- Grazed	25
9/27/01	Grass	Good-Grazed	37

**I. (#2 South)****Owner: Payne Wiegel**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Grass	Great	59
6/20/01	Grass	Good	40
7/9/01	Grass	Good - Grazed	17
7/25/01	Grass	Good - Grazed	62
8/8/01	Grass	Less Than 2 Inches (over grazed)	*
8/22/01	Grass	Good - Grazed	43
9/13/01	Grass	Good- Grazed	20
9/27/01	Grass	Good-Grazed	38

**J. (#2 South)****Owner: Russel Reese**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Grass	Great - Grazed	15
6/20/01	Grass	Great	16
7/9/01	Grass	Great	8
7/25/01	Grass	Great	16
8/8/01	Grass	Great - Tall	14
8/22/01	Grass	Great - Tall - Ready to Cut	17
9/13/01	Grass	Good	12
9/27/01	Grass	Good	25

**K. (#2 North)****Owner: Russel Reese**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Grass	Great - Grazed	17
6/20/01	Grass	Great	14
7/9/01	Grass	Great	11
7/25/01	Grass	Great	16
8/8/01	Grass	Great - Tall	14
8/22/01	Grass	Great - Tall - Ready to Cut	14
9/13/01	Grass	Good	10
9/27/01	Grass	Good	25

**L. (#4)****Owner: Randy Chandler**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Grass	Great	17
6/20/01	Grass	Great - Recently Cut	13
7/9/01	Grass	Good	14
7/25/01	Grass	Good	14
8/8/01	Grass	Good	18
8/22/01	Grass	Good	15
9/13/01	Grass	Ok	15
9/27/01	Grass	Ok	36

**M. (#5 East)****Owner: Dean Williams**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Alfalfa	Great- Ready to cut	8
6/20/01	Alfalfa	Great- Recently cut	10
7/9/01	Alfalfa	Great	7
7/25/01	Alfalfa	Great- Ready to cut	9
8/8/01	Alfalfa	Great - Irrigated	7
8/22/01	Alfalfa	Great	5
9/13/01	Alfalfa	Great	7
9/27/01	Alfalfa	Great- Recently cut	12

**N. (#5 West)****Owner: Dean Williams**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Alfalfa	Great- Ready to cut	11
6/20/01	Alfalfa	Great- Recently cut	8
7/9/01	Alfalfa	Great	6
7/25/01	Alfalfa	Great- Ready to cut	8
8/8/01	Alfalfa	Great - Irrigated	10
8/22/01	Alfalfa	Great- Irrigated	4
9/13/01	Alfalfa	Great- Tall	6
9/27/01	Alfalfa	Great- Recently cut	8

**O. (#5 West Duplicate)****Owner: Dean Williams**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Alfalfa	Great- Ready to cut	10
6/20/01	Alfalfa	Great- Recently cut	8
7/9/01	Alfalfa	Great	7
7/25/01	Alfalfa	Great- Ready to cut	7
8/8/01	Alfalfa	Great - Irrigated	8
8/22/01	Alfalfa	Great- Irrigated	8
9/13/01	Alfalfa	Great- Tall	5
9/27/01	Alfalfa	Great- Recently cut	8

**P. (#6 East - By Home)**

**Owner: Floyd Johnson**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Grass	Great- Irrigated	8
6/20/01	Grass	Great - Tall	16
7/9/01	Grass	Great	6
7/25/01	Grass	Great - Grazed	14
8/8/01	Grass	Great - Tall	15
8/22/01	Grass	Good - Irrigated	25
9/13/01	Grass	Good	12
9/27/01	Grass	Good	13

**Q. (#6 West)**

**Owner: Floyd Johnson**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Grass	Great	10
6/20/01	Grass	Great - Tall	13
7/9/01	Grass	Great- Grazed	4
7/25/01	Grass	Good - Grazed	10
8/8/01	Grass	Good	11
8/22/01	Grass	Good	6
9/13/01	Grass	Good	9
9/27/01	Grass	Good	35

**R. (#7)**

**Owner: Garth Turnipseed**

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Grass	Great- Grazed	8
6/20/01	Grass	Great - Grazed	12
7/9/01	Grass	Good- Grazed	8
7/25/01	Grass	Great - Grazed	19
8/8/01	Grass	Great - Grazed	12
8/22/01	Grass	Good - Grazed	11
9/13/01	Grass	Good - Grazed	11
9/27/01	Grass	Good - Grazed	13

S. (#8)

Owner: Elden Bybee

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Grass	Great- Irrigated	11
6/20/01	Grass	Great - Ready to Cut	10
7/9/01	Grass	Great	7
7/25/01	Grass	Great - Ready to Cut	9
8/8/01	Grass	Great - Irrigated	3
8/22/01	Grass	Good - Grazed	5
9/13/01	Grass	Good - Grazed	9
9/27/01	Grass	Good - Grazed	18

T. (#11)

Owner: Utah Power

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Grass	Great- Grazed	15
6/20/01	Grass	Great - Irrigated	13
7/9/01	Grass	Great	9
7/25/01	Grass	Good	13
8/8/01	Grass	Good - Grazed	17
8/22/01	Grass	Good - Grazed	13
9/13/01	Grass	Good	13
9/27/01	Grass	Good	27

U. (#12)

Owner: Rick Dixon

<u>Date</u>	<u>Crop</u>	<u>Condition</u>	<u>ppm Fluoride</u>
6/6/01	Alfalfa	Great - Ready to Cut	15
6/20/01	Alfalfa	Great- Recently cut	20
7/9/01	Alfalfa	Great	9
7/25/01	Alfalfa	Less Than 2 Inches	*
8/8/01	Alfalfa	Great - Irrigated	12
8/22/01	Alfalfa	Great- Ready to Cut	7
9/13/01	Alfalfa	Great- Recently Cut	9
9/27/01	Alfalfa	Great	20

Table 3. Combined Tabular Data For The Year

Fluoride Content In Plant Samples From Pocatello, 2001

Old Site	Type	6/6 ppm	6/20 ppm	7/9 ppm	7/25 ppm	8/8 ppm	8/22 ppm	9/13 ppm	9/27 ppm	Average ppm	
A (1) North	Alfalfa	65	55	40	32	30	20	36	42	40	Violates Annual Standard
B (1) South	Alfalfa	65	67	49	35	48	25	43	39	46	
C (1) South Duplicate	Alfalfa	67	67	40	37	47	27	37	33	44	
D (1) South Spiked	Alfalfa	142 <sup>1</sup>	140 <sup>3</sup>	115 <sup>5</sup>	90 <sup>7</sup>	104 <sup>9</sup>	89 <sup>11</sup>	96 <sup>13</sup>	90 <sup>15</sup>		
E (C) Logan	Grass	9	11	13	7	7	7	6	12	9	
F (C) Logan Spiked	Grass	23 <sup>2</sup>	27 <sup>4</sup>	28 <sup>6</sup>	23 <sup>8</sup>	19 <sup>10</sup>	19 <sup>12</sup>	20 <sup>14</sup>	23 <sup>16</sup>		
G (C) Control Trip	Grass	8	8	11	9	7	5	6	10	8	
H (2) South	Grass	59	40	17	62	*	43	20	38	40	
I (2) North	Grass	38	31	15	52	48	25	25	37	34	
J (3) South	Grass	15	16	8	16	14	17	12	25	15	
K (3) North	Grass	17	14	11	16	14	14	10	25	15	
L (4)	Grass	17	13	14	14	18	15	15	36	18	
M (5) East	Alfalfa	8	10	7	9	7	5	7	12	8	
N (5) West	Alfalfa	11	8	6	8	10	4	6	8	8	
O (5) West Duplicate	Alfalfa	10	8	7	7	8	8	5	8	8	
P (6) East - By Home	Grass	8	16	6	14	15	25	12	13	14	
Q (6) West	Grass	10	13	4	10	11	6	9	35	12	
R (7)	Grass	8	12	8	19	12	11	11	13	12	
S (8)	Grass	11	10	7	9	3	5	9	18	9	
T (11)	Grass	15	13	9	13	17	13	13	27	15	
U (12)	Alfalfa	15	20	9	*	12	7	9	20	12	

1. South 1 spiked with 83.0 ppm F (65 ppm + 83 ppm = 148 ppm; 96% recovery).
2. Logan sample spiked with 17 ppm F (9 ppm + 17 ppm = 26 ppm; 89% recovery).
3. South 1 spiked with 83 ppm F (67 ppm + 83 ppm = 150 ppm; 93% recovery).
4. Logan sample spiked 17 ppm F (11 ppm + 17 ppm = 28 ppm; 96% recovery).
5. South Duplicate spiked with 83 ppm F, 90% recovery.
6. Logan Sample spiked with 16.7 ppm F, 86.2% recovery.
7. South Duplicate spiked with 50.1 ppm F, 106 recovery.
8. Logan Sample spiked with 16.7 ppm F, 91% recovery.
9. South Duplicate spiked with 62.7 ppm F, 90.4% recovery.
10. Logan Sample spiked with 16.7 ppm F, 81% recovery.
11. South Duplicate spiked with 66.8 ppm F, 95.8% recovery.
12. Logan Sample spiked with 16.7 ppm F, 87.5% recovery.
13. South Duplicate spiked with 66.8 ppm F, 88% recovery.
14. Logan Sample spiked with 16.7 ppm F, 84% recovery.
15. South Duplicate spiked with 66.8 ppm F, 85% recovery.
16. Logan Sample spiked with 16.7 ppm F, 80% recovery.

\* Means that the sample was less than 2 inches from over grazing or harvesting of crop.

Table 4.

Average Fluoride Content (ppm) In Plant Samples From Different Sites In Pocatello, 1997, 1998 and 1999, 2000 and 2001.

		<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<i>Increasing Trend</i>
P1	Alfalfa	20	33	35	36	40 N, 46 S.	
P2	Alfalfa	20	21	42	44	34 N, 40 S.	
P3	Alfalfa	15	13	23	18	15 N & S.	
P4	Grass	15	21	26	23	18	
P5	Alfalfa	6	12	14	12	8 N & S	
P6	Grass	7	13	14	13	14 E, 12 W.	
P7	Alfalfa	10	12	18	14	12	
P8	Alfalfa	10	10	19	13	9	
P10	Grass	13	23	20	20		
P11	Grass	14	18	32	26	15	
P12	Alfalfa	18	14	22	17	12	
P13	Grass	14	23	19	21		
P14	Grass	8	16	13	12		
P15	Alfalfa	14	35	23	19		
P18	Grass	20	30	31	24		
P22	Alfalfa				39		

N = North

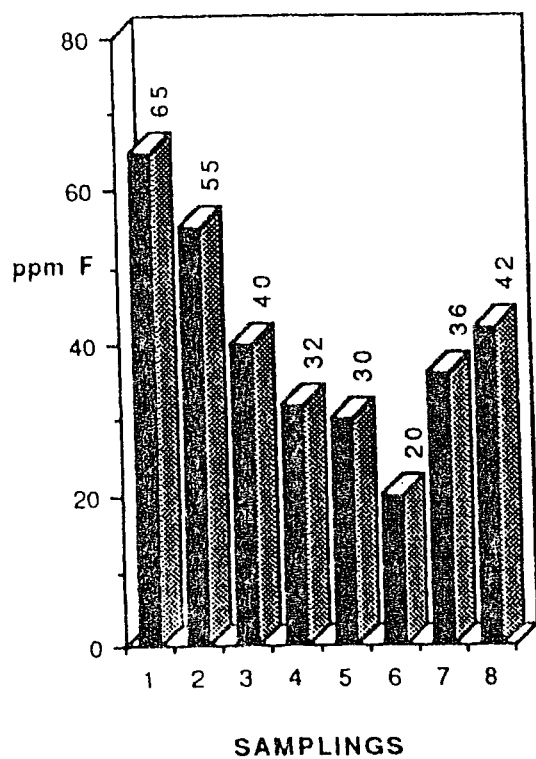
S = South

E = East

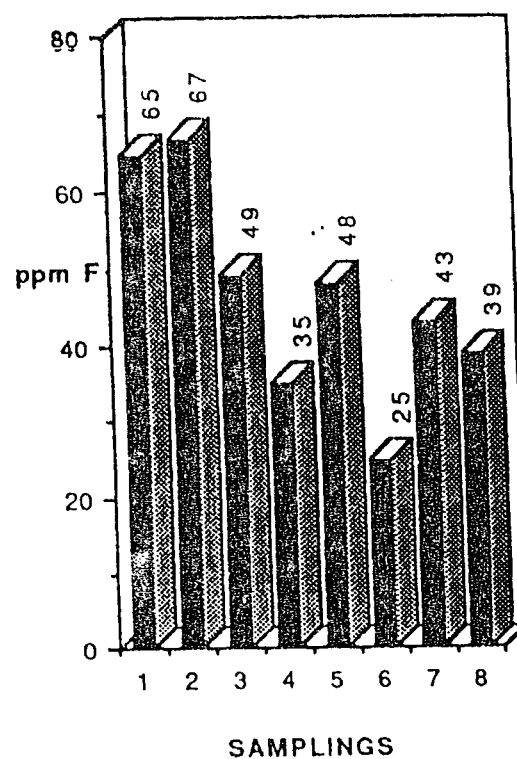
W = West

Figure 1

ALFALFA, AREA - A (#1 NORTH)



ALFALFA, AREA - B (#1 SOUTH)



ALFALFA, AREA-C (#1 S.DUPLICATE)

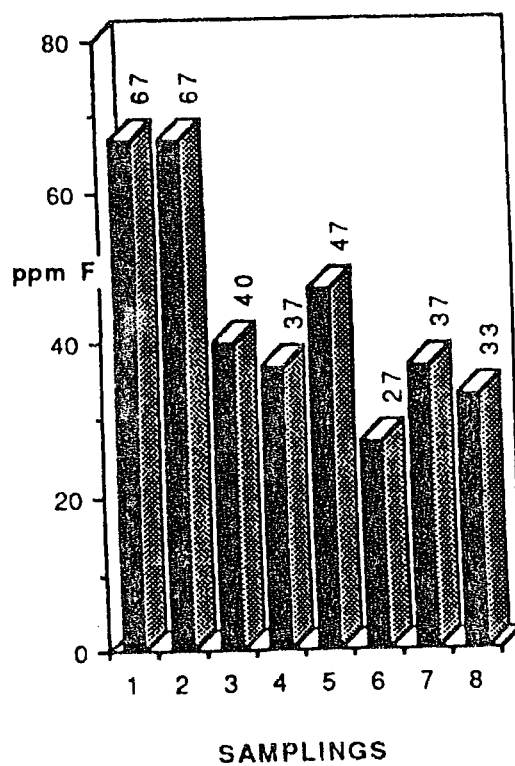
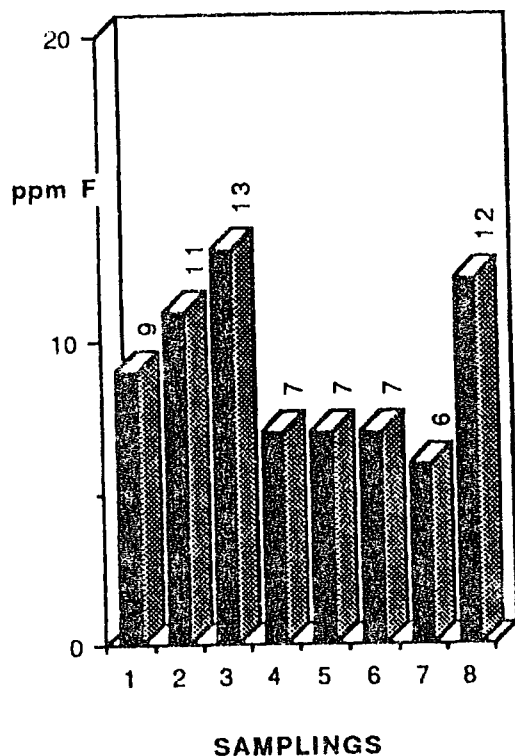
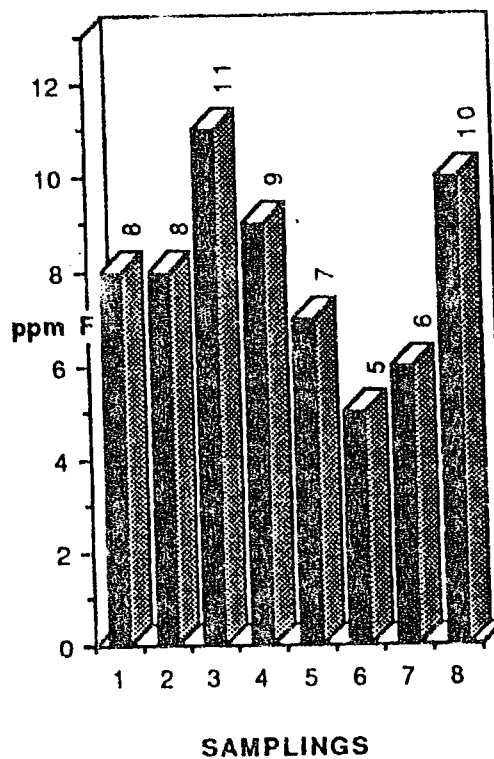


Figure 2

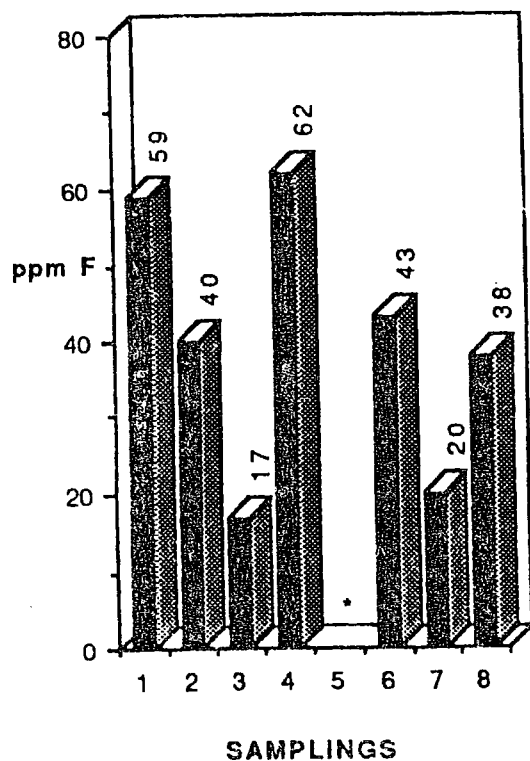
GRASS, AREA - E (#C LOGAN)



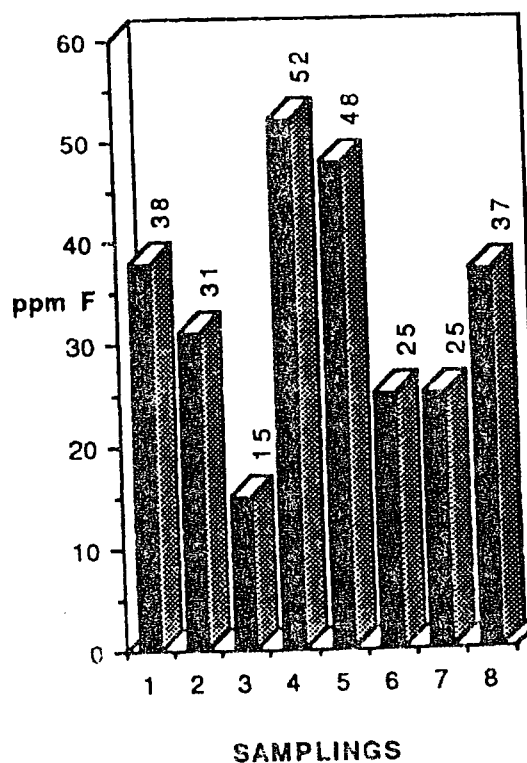
GRASS, AREA-G(#C CONTROL TRIP)



GRASS, AREA - H (#2 SOUTH)



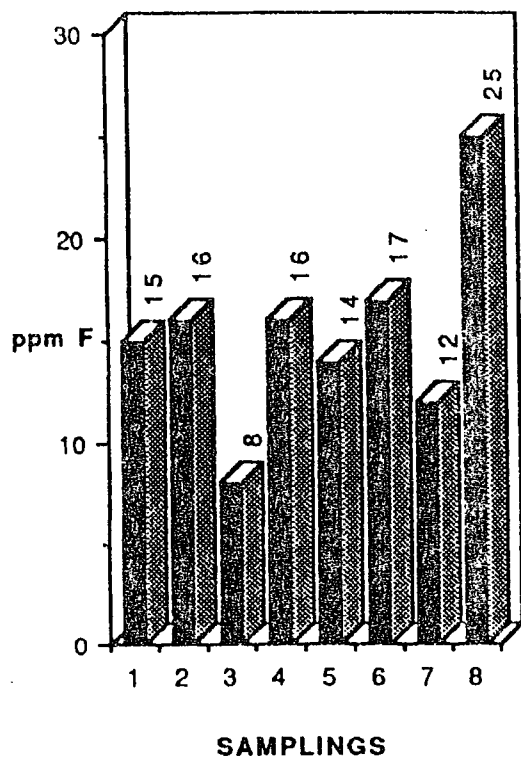
GRASS, AREA - I (#2 NORTH)



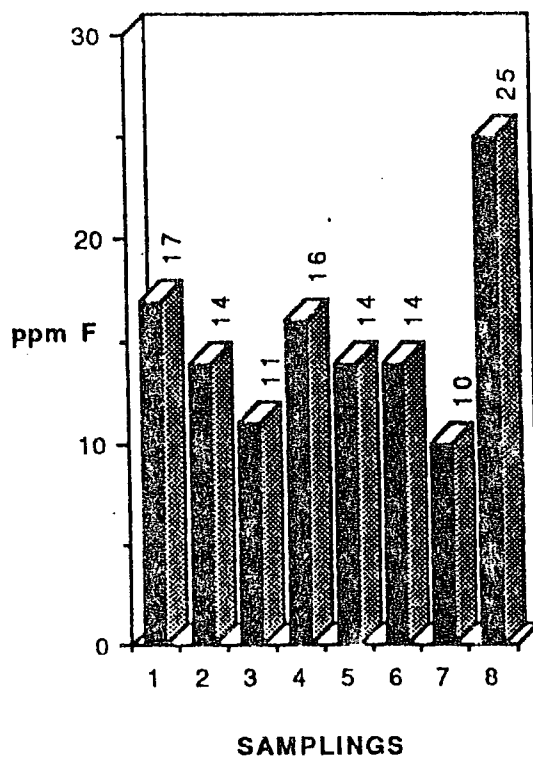
\* Less than 2 inches, Not Sampled.

Figure 3

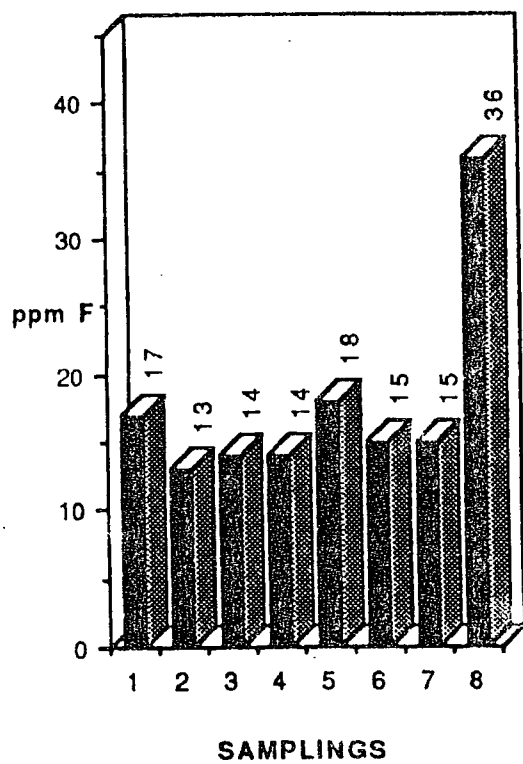
GRASS, AREA - J (#3 SOUTH)



GRASS, AREA - K (#3 NORTH)



GRASS, AREA - L (#4)



ALFALFA, AREA - M (#5 EAST)

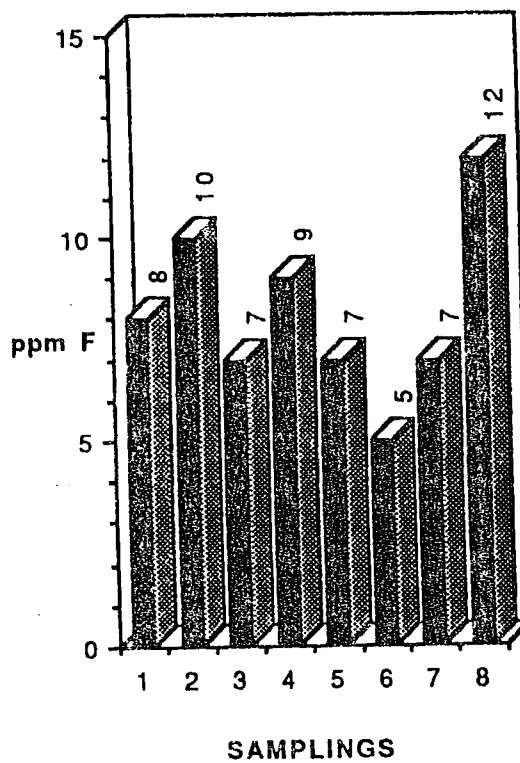
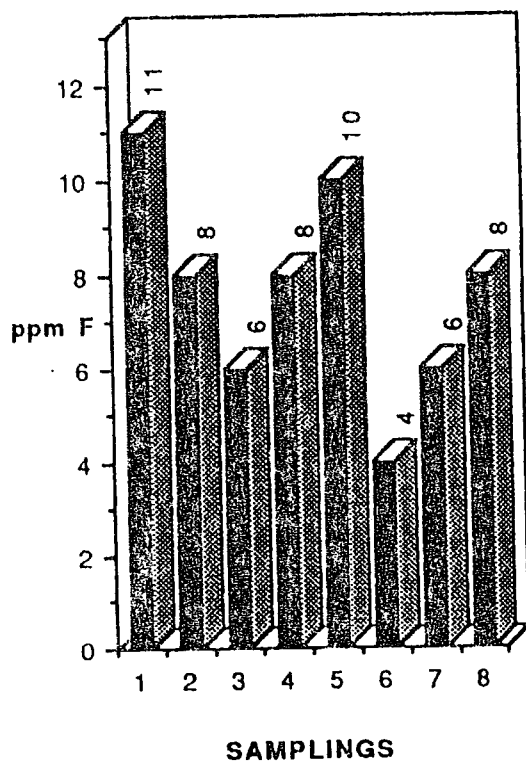
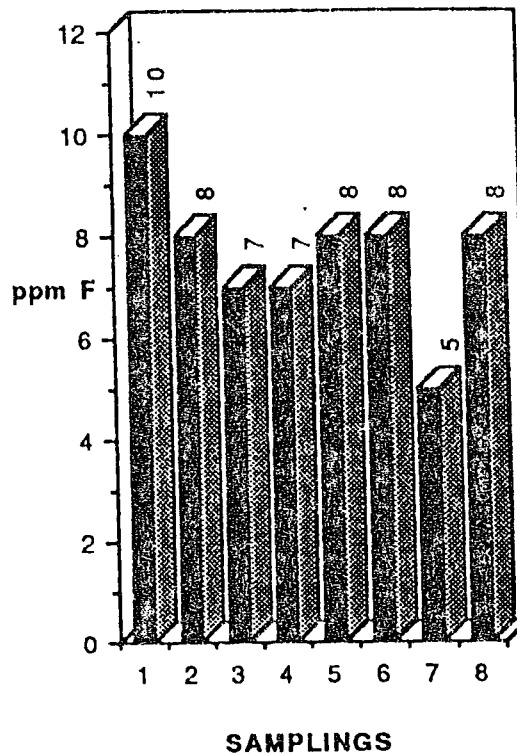


Figure 4

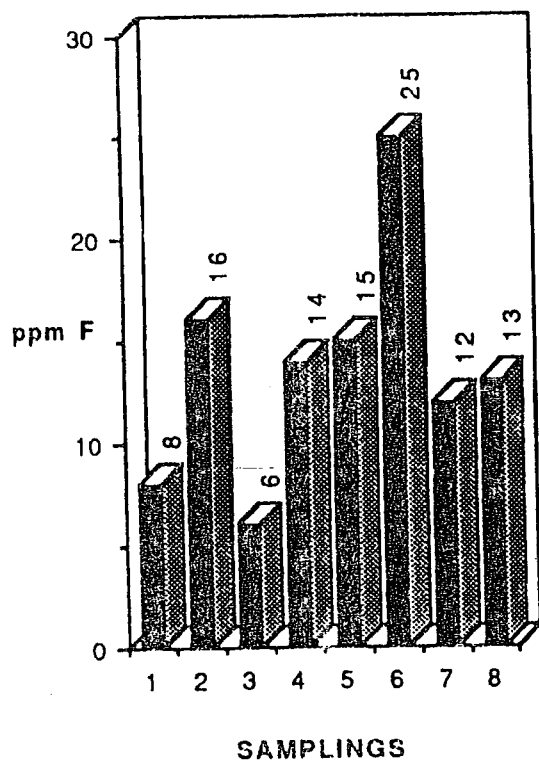
ALFALFA, AREA - N (#5 WEST)



ALFALFA, AREA-O (#5 W.DUPLICATE)



GRASS, AREA - P (#6 EAST)



GRASS, AREA - Q (#6 WEST)

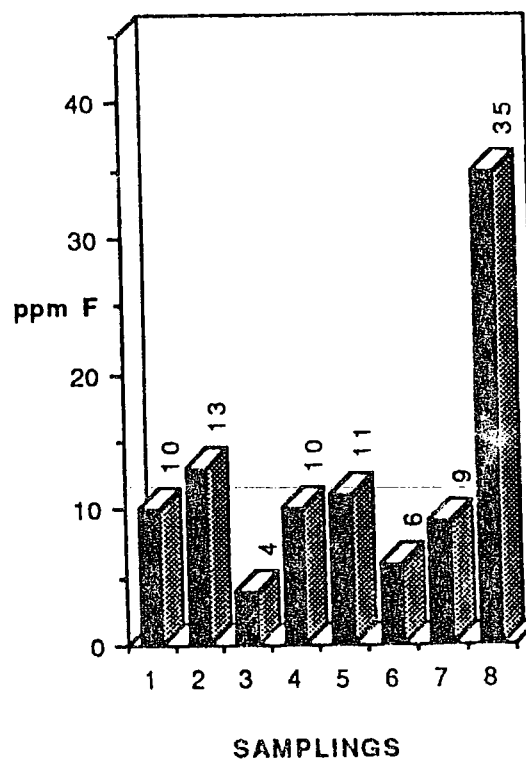
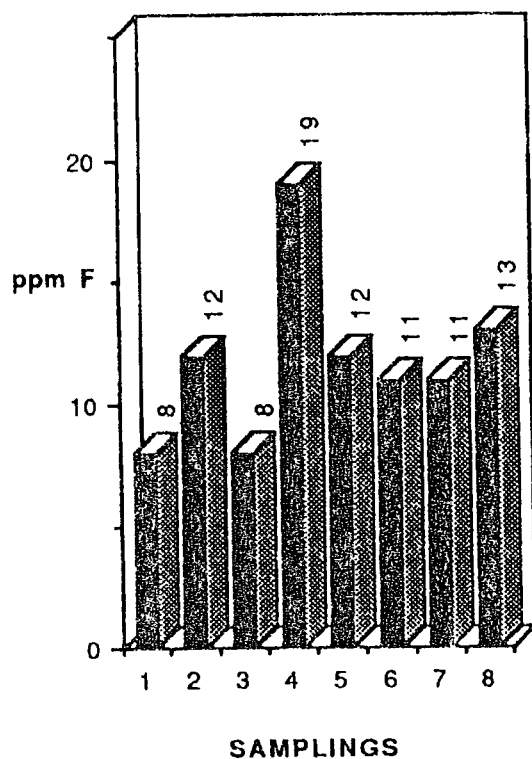
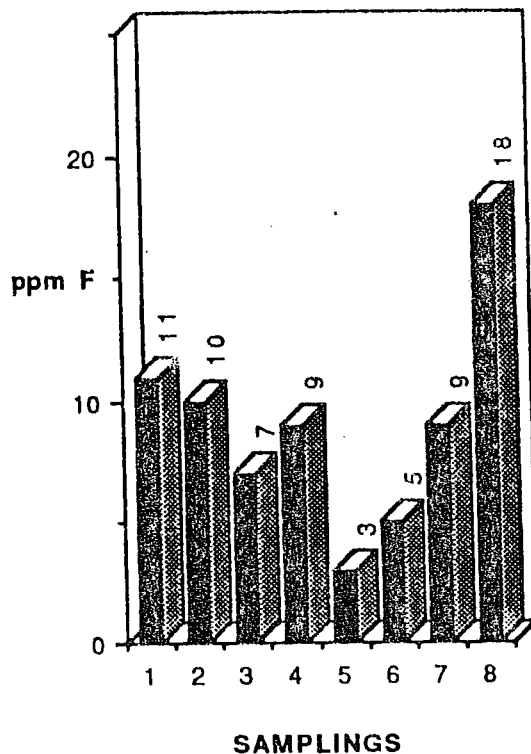


Figure 5

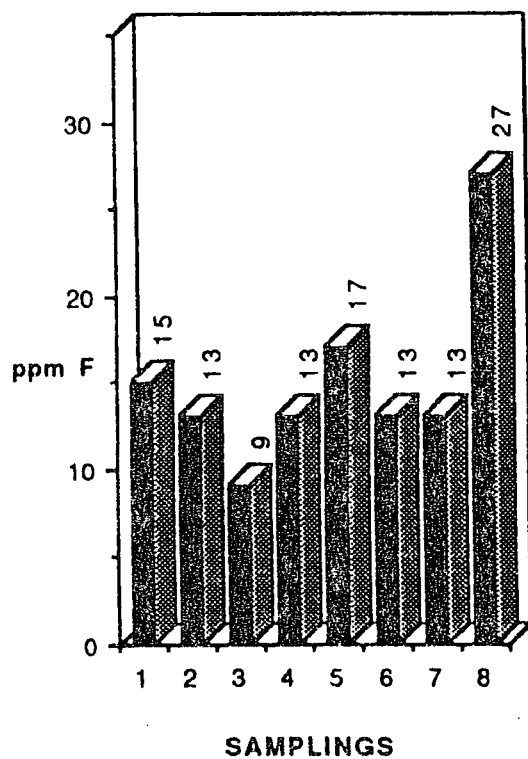
GRASS, AREA - R (#7)



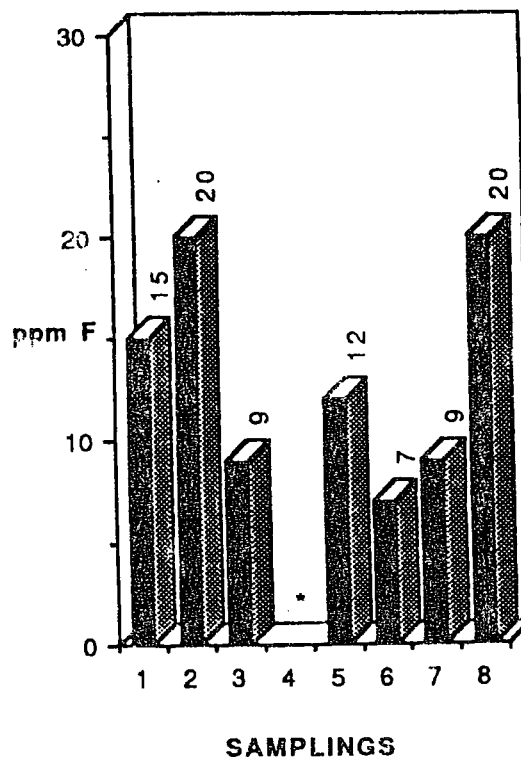
GRASS, AREA - S (#8)



GRASS, AREA - T (#11)



ALFALFA, AREA - U (#12)



\* Less than 2 inches, Not Sampled.

FIGURE 6

POCATELLO-SITE LOCATIONS AND SEASONAL MEAN FLUORIDE VALUES

SITE/CROP - VALUE

- GRASS  
□ ALFALFA

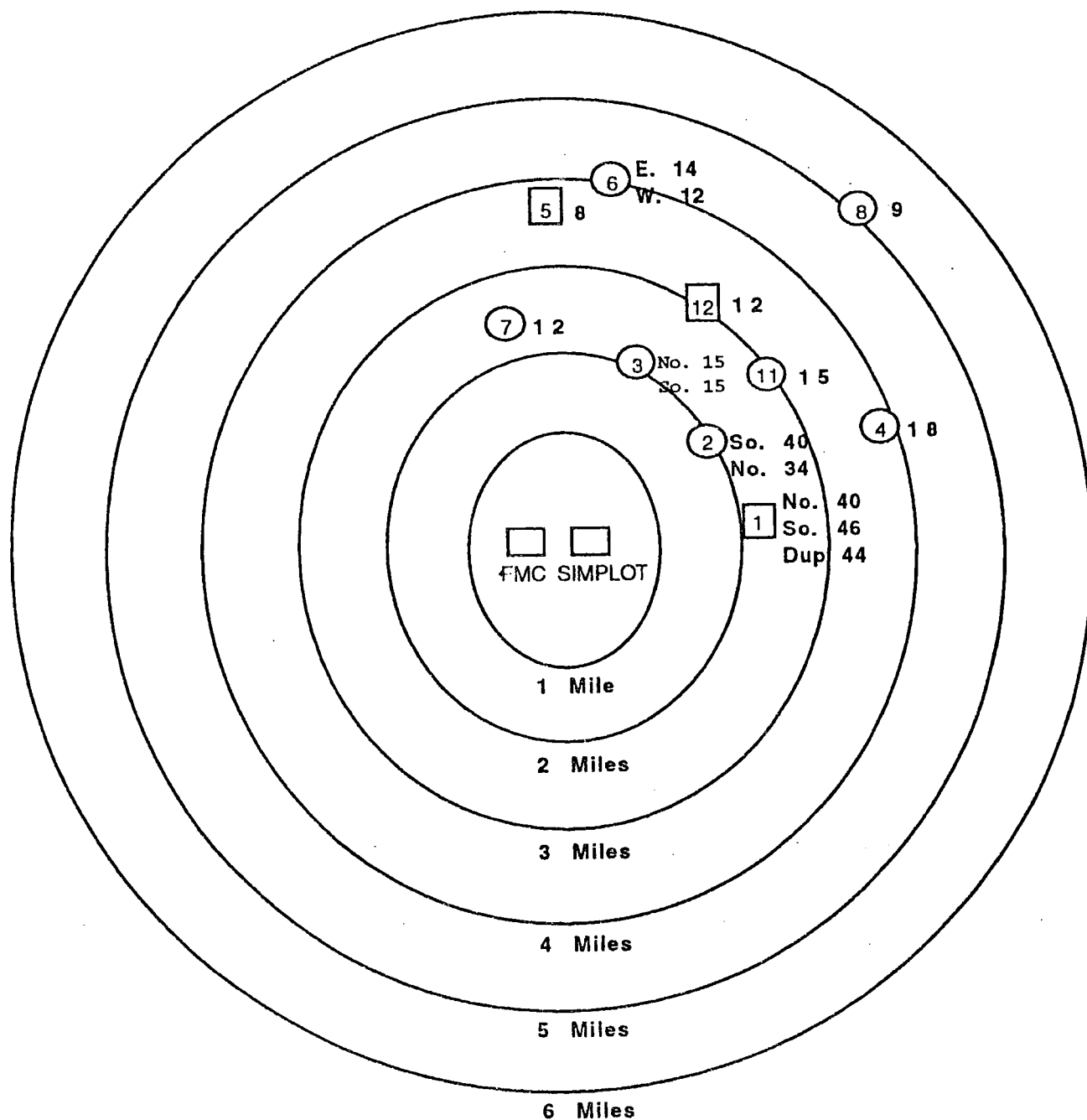


Figure 7

